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6	In the Matter of :)		
7	Iron Mountain Mine)) Order	No. 89-18	
8	·)	05 10	
9	Iron Mountain Mines, Inc., T.W. Arman, Stauffer Chemical Co., a Division of))		
10	Rhone-Poulenc, Inc.) }		
11	Respondents))		
12 13	Proceeding under Section 106 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986,) }		
14		,))		
15	(42 U.S.C. § 9606))		
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17	ORDER			
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I. Jurisdiction

This Order is issued to Iron Mountain Mines, Inc., T.W.

("Ted") Arman, and Stauffer Chemical Co. (Respondents) pursuant
to the Comprehensive Environmental Response, Compensation and
Liability Act of 1980, as amended by the Superfund Amendments and
Reauthorization Act of 1986, by authority delegated to the Administrator of the United States Environmental Protection Agency

(EPA), and redelegated to the EPA Regions.

The Director of the Hazardous Waste Management Division, EPA Region 9, has determined that there may be an imminent and substantial endangerment to the public health, welfare or the environment because of the release and threatened release of hazardous substances from the Iron Mountain Mine facility.

II. Findings of Fact

Site description

Iron Mountain Mine ("IMM" or "the Site") is located in the southeastern foothills of the Klamath Mountains, approximately nine miles northwest of the City of Redding. Between the 1860's and 1963, IMM was periodically mined for iron, silver, gold, copper, zinc, and pyrite. The mine area is located on 4,400 acres of property that includes an open pit mine, underground workings, waste rock dumps and tailings piles.

IMM averages 70-80 inches of precipitation per year, most of

it falling in the form of rain between the months of November and April.

IMM is drained by Boulder Creek to the north, and Slickrock Creek to the south of the mine. Boulder Creek, a perennial stream, receives a portion of its flows from the Lawson and Richmond adits via their mine portals. Slickrock Creek, an intermittent stream, receives discharges from underground seepage and surface flows from the Brick Flat Pit area. A debris slide diverted the original Slickrock Creek drainage and buried adits from which acid mine drainage is emanating.

Slickrock Creek and Boulder Creek flow southeastward into Spring Creek, which flows into the Spring Creek Reservoir, created by the construction in 1963 of the Spring Creek Debris Dam, a unit of the Central Valley Project. Releases from Spring Creek drain into Keswick Reservoir, where they mix with releases of clean water from Shasta Dam.

Historic mining activity at IMM has fractured the mountain increasing access of surface water and rain water and oxygen to the mineralized zones within the mine. Precipitation and surface water infiltrating the mountain forms sulfuric acid in the presence of oxygen due to the oxidation of the pyrite. The sulfuric acid is drained by the mine workings and leaches out copper, cadmium, zinc and other metals. This heavy metal laden acid mine drainage flows out of the mine portals and seeps. Much of the metals bearing acid mine drainage is ultimately channeled by the creeks into the Spring Creek Reservoir. The Bureau of Reclamation periodically releases the stored acid mine drainage

impounded behind Spring Creek Debris Dam into Keswick Reservoir. Planned releases are timed to coincide with the presence of diluting waters from Shasta Dam. On occasion, unplanned spills and excessive waste releases have occurred from Spring Creek Debris Dam, resulting in the release of harmful quantities of metals in the Sacramento River.

History of site ownership

IMM was first secured for mining purposes in 1865. Limited mining began in 1879 for the recovery of silver and gold. In 1895, IMM was sold to Mountain Mining Co., Ltd., following discovery of massive copper sulfide deposits. Mining continued under their ownership until 1897 when the property was transferred to Mountain Copper Co., Ltd. of London, England. Mountain Copper Co., Ltd., conducted extensive mining operations at the site during the first half of the twentieth century. In 1955 a large landslide covered two mine portals in Slickrock Creek Canyon. In 1956, underground mining of the Richmond ore body ceased. Open pit mining of the Brick Flat Pit continued until 1962.

In 1967, Stauffer Chemical Company purchased the site. The full nature and extent of Stauffer's activities at the site are unknown. Stauffer operated cementation plants on the property at least part of the time it owned IMM. Acid mine drainage continued to be formed during this period of ownership and the release of hazardous substances into the environment at IMM continued during the period of Stauffer's ownership of IMM. On November 5, 1976, the Regional Water Quality Control Board, Central Valley Region

("Regional Board") issued Stauffer a cleanup and abatement order requiring Stauffer to take corrective measures to reduce the discharge of heavy metals into the Sacramento River.

In December 1976, one month after the Regional Board issued it an order, Stauffer sold the property to Iron Mountain Mines, Inc. ("IMMI"). IMMI, a California corporation, is the current owner of IMMI. Ted Arman is the president of IMMI. IMMI has owned and operated the site since 1976. Since 1977, IMMI has operated off and on two copper cementation plants to recover copper from the acid mine drainage from the Slickrock and Boulder Creek drainages.

Subsequent to the sale of the IMM property, Stauffer was itself the subject of several transactions. Stauffer Chemical Co. is currently Stauffer Chemical Co., a Division of Rhone-Poulenc, Inc., a Delaware corporation.

Regulatory history

Prior to the IMMI's acquisition of the property, on October 25, 1976 and November 1, 1976, Regional Board staff contacted corporate officers and legal staff of IMMI to present Regional Board concerns regarding the discharge of heavy metals into Spring Creek. At that time, IMMI agreed that the discharge from the property is a water quality problem and stated their goal was to eliminate most, if not all, of the discharges from IMM.

On June 9, 1977, IMMI submitted a report of waste discharge for the discharge of acid mine drainage and run-off containing high concentrations of metals and acid compounds to the Regional

Board. At that time, the Regional Board referenced a 1976 United States Geological Survey Report to the effect that Spring Creek contributes 50 percent of the copper and 42 percent of the zinc to the Sacramento River at Redding. The Regional Board adopted waste discharge requirements for discharge of acid mine drainage and run-off from several non-point sources in July 1977. On August 17, 1977 the Regional Board issued IMMI an order requiring that IMMI, among other matters, reduce the rate of discharge of copper into Slickrock Creek from the Old Mine/No. 8 by 95 percent and eliminate or reduce to the maximum extent practicable, the discharge into Boulder Creek of run-off containing heavy metals.

On September 22, 1978, the Regional Board issued IMMI waste discharge requirements and an NPDES permit (Order 78-152) for discharges of copper cementation plant effluent of treated mine drainage from the Richmond and Hornet Mines into Boulder Creek and from the Old Mine/No. 8 into Spring Creek.

On January 9, 1979, the Regional Board notified IMM of violations and threatened violations of Order No. 78-152 and on January 26, 1979, issued IMMI a cease and desist order for these violations and threatened violations. On July 27, 1979, the Regional Board found IMMI in violation of Order No. 78-152 and the cease and desist order. The Regional Board found that IMMI partly complied with the Order for only two weeks. The inefficient operation of its metals removal operations resulted in a potential overflow condition at Spring Creek Debris Dam and required controlled releases from the Spring Creek Debris Dam. Not only did this event require the otherwise unnecessary release of

70,000 acre feet of irrigation water, the Regional Board estimated that the release of IMM contaminated water killed 10 percent of the juvenile chinook salmon and 50 percent of the juvenile steelhead trout present in the Sacramento River below Keswick Dam.

This matter was referred to the California Attorney General and in July 1980 a stipulated preliminary injunction was issued by Shasta Superior Court. As part of that stipulated injunction, IMMI agreed to install within six months a new system for treatment of zinc, cadmium, and other metals. In March 1981, IMMI was found in contempt of court for failure to comply with conditions in the injunction.

On July 24, 1981, the Regional Board found that IMMI continued to be in violation and requested assistance in abating the nuisance from other public agencies.

EPA involvement

On September 8, 1983, IMM was included on the EPA National Priorities List of the nation's most contaminated sites. That month, EPA commenced a Remedial Investigation and Feasibility Study ("RI/FS") to study and evaluate potential remedies for the Site. During the course of that investigation, which extended from September 1983 to April 1985, EPA conducted weekly sampling of five major sources at the mine and three locations on Spring Creek, and biweekly sampling at four locations along the Sacramento River for heavy metals; installed flow measurement stations at eight locations, including mine portals and

downstream receiving waters; measured precipitation at six gauges throughout the area; reviewed all existing literature on the site; conducted a groundwater investigation; and conducted two comprehensive surface sampling surveys, involving 76 sampling points, in September 1983 and December 1983.

During a dry period in September 1983 and a rainy period in December 1983 EPA conducted the two intensive sampling programs to locate and quantify the sources of heavy metals pollution at the IMM. The Regional Board conducted sampling in April 1983 which reflect usual late winter conditions when the mountain is saturated. The sampling station locations are identified in Figure 2 of the Record of Decision. The rankings of the heavy metals contribution for copper, cadmium and zinc are shown in Figure 3 of that document.

The RI identified five major sources as responsible for approximately seventy two percent of the copper and eighty six percent of the zinc and cadmium being discharged from the site during the sampling period. These sources were: the Richmond Portal, the Lawson portal, Old Mine/No. 8 seep, Big Seep, and the Brick Flat Pit By-Pass. In addition to the five major sources, EPA identified numerous other sources of releases of metals and acid mine drainage at the Site. The studies completed by EPA in 1983 show that the flow of acid mine drainage through tailings piles on the IMM property is also contributing to metals contamination.

On October 3, 1986, Assistant Administrator J. Winston Porter approved a Record of Decision for the Site based substantially

upon the information developed under the RI/FS. Pursuant to 40 C.F.R. § 300.68(i)(5)(ii), the remedy selected did not meet all applicable or relevant and appropriate federal requirements because of the need to use Fund moneys at other sites. Consequently the Iron Mountain Mine ROD did not address all sources of contamination at the Site or the means to correct all releases. This order requires actions that will abate sources not addressed in the ROD and requires additional control measures not included in the ROD, as provided below.

The ROD approved for the Site authorized the following activities: the construction of a cap over the Richmond mineral deposit to reduce infiltration into this source of acid mine drainage; diversion of clean surface water from the Upper Spring Creek watershed before it reaches the portion of the basin affected by IMM; diversion of clean water from the South Fork of Spring Creek; diversion of clean water from Upper Slickrock Creek; enlargement of the Spring Creek Debris Dam; installation of necessary perimeter controls; and conducting a study to better define the use of low density cellular, concrete to minimize the formation of acid mine drainage.

As explained in the ROD, the "selected remedy does not: address all waste rock dumps or tailings piles along Boulder Creek and Slickrock Creek; collect and treat all seeps or subsurface drainage along Boulder Creek and Slickrock Creek; address metalbearing sediments in receiving waters; or fully achieve aquatic water quality standards in Boulder Creek, Slickrock Creek, portions of Spring Creek, and Keswick Reservoir." One responsible

party, Stauffer additionally recommended "[d]iversion of overland runoff" and [t]reatment of mine drainage from the Richmond and Lawson portals through the existing cementation plants" as additional components of a remedial action (letter of Nov. 20, 1985).

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On July 19, 1988, EPA initiated construction of the cap over Brick Flat Pit. As part of that construction, EPA utilized tailings materials from the Minnesota Flats area as well as selected other tailings piles which contained relatively high concentrations of copper, cadmium, and zinc.

IMMI and Ted Arman opposed the use of the tailings piles, a source of metals contamination, because they claimed that the tailings piles constituted a valuable product. EPA accorded IMMI and Ted Arman an opportunity to remove the tailings piles or submit a plan to eliminate the tailings piles in the cap in advance of EPA's intended use of the materials. IMMI failed to remove the tailings piles or submit an acceptable plan in advance of EPA's use of the materials.

EPA used approximately 75,000 tons of tailings and other material to fill in Brick Flat pit. In a letter from Ted Arman of IMMI, submitted to the Eastern District of California in support of an Ex Parte Motion, Ted Arman stated that IMMI had "current and future sales" of 140,000 tons of "sulfuron" annually, for a total value of \$8,400,000 annually. "Sulfuron" is Ted Arman's term for the iron pyrite in the tailings piles.

EPA began design of the stream diversion structures in September 1987. EPA began construction of the Slickrock Creek diversion in July, 1989. EPA is scheduled to begin construction

of the other two approved diversion structures in April, 1990. During and even after the construction of the EPA source controls and diversions, there will remain a need to use additional controls to reduce the flow of acid mine drainage and the concentrations of metals flowing into the Spring Creek Reservoir and Keswick Reservoir.

Uncontrolled sources of contamination

Additional sources requiring control include the tailings piles, mineral stockpiles and dumps and seeps in the Boulder Creek and Slickrock Creek drainages. During storm events, tailings piles, mineral stockpiles and dumps in the Boulder Creek drainage contribute up to 7 percent of the cadmium, 20 percent of the copper and 4 percent of the zinc in Boulder Creek.

Groundwater and surface water migrating through an old waste rock dump serve as the sources of the drainage from the Big Seep in the Slickrock Creek drainage. This seep and others in Slickrock Creek contribute from two percent to 25 percent of the hazardous metals in Slickrock Creek. The hematite pile along Slickrock Creek contributes about one percent of the metals in Slickrock Creek.

The studies completed by EPA in 1983 show that site 14, a tailings pile with a seep located above Boulder Creek, contributes as much as 26 pounds a day of heavy metals copper, cadmium and zinc; site 34, the hematite pile, provides runoff containing up to 28 pounds a day of heavy metals; and site 15, tailings with a seep located near site 14, is the source of up to 13

pounds a day of these metals. A fourth tailings pile, site 90, furnished up to 7.8 pounds of metals a day. Site 90 was substantially removed by EPA in 1988 and used as fill material in the cap at Brick Flats Pit. In addition to the tailings pile studied in the 1983 studies, there are numerous tailings piles scattered about the property which have the potential to contribute metals contamination in the Spring creek drainage.

Operation of cementation plants has historically been used to treat some of the acid mine drainage in the Boulder Creek and Slickrock Creek drainages. Two cementation plants have been operated at IMM, one in Boulder Creek and a second plant in Slickrock Creek. These plants, when properly operated have reduced, but not eliminated, the copper concentrations in the acid mine drainage. The cementation plants do not appreciably reduce cadmium or zinc concentrations. The cementation plants receive flows from some of the main sources of contamination at IMM, including the Richmond portal, the Lawson portal and the Old Mine/No. 8 seep.

The discharge from the Boulder Creek cementation plant contributes approximately 20 to 40 percent of the copper, 90 to 95 percent of the cadmium, and 90 to 95 percent of the zinc measured in Lower Boulder Creek. The Boulder Creek cementation plant receives acid mine drainage continually from the Richmond and Lawson mine portals through a series of pipes and flumes. Leaks and spills from the collection system are additional sources of pollutant discharges.

The Slickrock cementation plant receives drainage discharged

continuously from the Old Mine/No. 8 mine seep. The discharge from the Slickrock cementation plant contributes approximately 75 to 95 percent of the copper, cadmium, and zinc measured in Lower Slickrock Creek.

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On July 19, 1988, the Regional Board adopted Cleanup and Abatement Order No. 88-713 ordering IMMI to control continuing discharges of metals. The Order required IMMI to reduce the discharge of acid from the Richmond workings to achieve a 95 percent reduction of acid and heavy metal concentrations; continue to treat the Richmond adit discharge through April 1, 1989, or later if deemed necessary by the Regional Board; and implement modifications as needed and continue operating the Boulder and Slickrock copper cementation plants to achieve 95 percent copper removal from the Lawson and No. 8 adit flows. The Regional Board issued this Order to prevent injury to fish and other aquatic resources as a result of toxic metal concentrations. Because of the prevailing drought conditions, water storage in Shasta and Trinity Reservoirs was low, rendering these historic sources of dilution flows substantially unavailable in the event of a release of IMM contaminated water from Spring Creek Reservoir. If the discharge of acid and metals were not abated, the Regional Board found, "the continued discharge during the upcoming fall and winter will cause a condition of pollution and nuisance in Keswick reservoir and the Sacramento river. The acid mine drainage, without the benefit of dilution from receiving waters, will result in concentrations of heavy metals that will be acutely toxic to fish and other aquatic life and will unreasonably affect beneficial uses in Keswick Reservoir and the Sacramento River."

The California Department of Fish and Game, in a letter supportive of the Regional Board's action, stated that "[w]ithout increased treatment, uncontrolled releases of acid mine drainage mixed with the legal minimum streamflow release from Keswick Dam will result in large scale destruction of fishlife as well as loss of domestic water supplies." (Letter of July 8, 1988 from A.E. Naylor, Department of Fish and Game to William Crooks, Regional Board.) The Department of Fish and Game identified the following fisheries resources at risk: winter run chinook, fall run chinook, spring-run and late fall-run chinook, and steelhead trout and juvenile rainbow trout. The Department of Fish and Game estimated the economic value of the fall run chinook population in the area impacted by the mine discharge as over \$30 million for 1988 and stated that an extremely popular sport fishery is supported by the fall-run and resident rainbow trout.

The Regional Board's findings noted, among other matters that the Richmond adit is the source of 80 percent of the zinc and cadmium and 40 percent of the copper discharged from the mine. Although the copper cementation plant removes copper, this process does not reduce the zinc or cadmium which are equally toxic to aquatic life. The Regional Board stated that lime or limestone neutralization as a method of reducing metals levels has been thoroughly tested on IMM and has been proven to be an effective method of removing acids and toxic metals.

IMMI responded to the Order on July 29, 1988. IMMI refused

to comply with the Order, claiming that its diversion work had already "significantly reduced mine water discharges" and that "[i]t is most unlikely that the upcoming fall and winter rainfall will cause a condition of pollution or nuisance." After a review of this response, the Regional Board wrote IMMI on September 1, 1988 that IMMI's response was inadequate, that IMMI was in violation of the Order, and that the State would proceed with attempts to treat the mine drainage.

In September, 1988, EPA in cooperation with the Department of Fish and Game and the Regional Board began setting up a treatment plant to treat the acid mine drainage from the Richmond Portal. The performance goal for that operation was the removal of 95 percent of the cadmium and zinc concentrations in the acid mine drainage. The treatment plant was scheduled to be in place by November 1, 1988, in time for the beginning of the usual rainy season. EPA operated the treatment plant from mid-December, 1988 to February 28, 1989.

EPA's operation of the lime treatment facility resulted in a significant reduction in the metals and acidity of the mine runoff. As a result, during the winter months EPA was operating the lime treatment facility it was possible to release impounded waters behind Spring Creek Debris Dam into Keswick Reservoir without adverse impacts despite the low quantities of receiving water available for dilution. In early March, EPA removed its lime treatment plant when it appeared that the drought would continue. At that time, the Spring Creek Reservoir was evacuated to the point that there was sufficient capacity to store average

runoff during March.

In March, 1989, the Bureau of Reclamation reduced flows in the Sacramento River from Keswick Dam to 2300 cubic feet persecond, as allowed under a 1960 Memorandum of Understanding between the Department of Fish and Game and the Bureau of Reclamation.

Unusually heavy March storms, greatly exceeding the monthly average, filled the Spring Creek Debris Dam, resulting in a dangerous situation in which high acid spillovers from Spring Creek would enter the river without sufficient diluting flows from the Central Valley Project. Spring Creek Debris Dam overflowed at a high rate for a week. To minimize damage over the entire spill period, an estimated 64,000 acre feet of water were released to provide diluting flows. Despite the release of additional dilution flows, the overflow killed an estimated 10 percent of the late fall chinook salmon and 50 percent of the steelhead trout during periods of inadequate dilution. There were additional sublethal impacts on the surviving fish.

This experience proved the value of an ongoing treatment system. Had EPA not implemented the lime treatment system over the winter, Spring Creek Debris Dam would not have been nearly empty when the heavy March rains came and the Dam would have spilled over perhaps as much as two to three weeks earlier. Had the spill occurred two weeks earlier, it is estimated the amount of dilution water needed in March would have doubled. In addition, the toxicity of the Spring Creek Reservoir waters would have increased without the substantial removal of acid, copper,

zinc and cadmium that occurred as a result of the treatment operation. Since the spill had been delayed as well as reduced in strength, the life stages of early fall-run chinook and winter-run chinook that were present were older and could tolerate the concentrations of metal associated with the spill. There were late-fall chinook fry and steelhead fry present at the time of the spill and they suffered some mortality. Because the reservoir was nearly empty, the agency bought additional time to wait for the build-up of necessary diluting waters behind Shasta Dam.

Conditions similar to those which existed last winter are present this year. On July 25, 1989, Pete Bontadelli, Director of the California Department of Fish and Game wrote Daniel McGovern, Regional Administrator, Region 9, requesting EPA assistance in addressing the impending fish emergency for the winter of 1989-90. In that letter, Mr. Bontadelli stated that "[p]oor water supply conditions and the continued discharge of acid and toxic metals from the site threaten to adversely impact very valuable species of salmon and steelhead....The prolonged drought over the last two years coupled with high water demands is forecasted to result in poor water supply conditions in Shasta Reservoir this winter. The U.S. Bureau of Reclamation (USBR) has previously state that releases to dilute toxic waste from Iron Mountain Mine will not be made available when the reservoir level is so low that there is no justification for anticipatory or actual flood control releases. The forecast for this winter's storage in Shasta Reservoir is approximately a million acre-feet below the

flood control level (based upon a historic annual inflow to Shasta Reservoir at 30th percentile)."

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Affected environment

The Sacramento is a valuable fisheries resource and is used as a source of drinking water by the City of Redding, with a population of over 50,000.

The Central Valley Regional Board adopted water quality standards applicable to the Sacramento River and the tributaries which flow into the Sacramento River from IMM on April 27, 1984. The State Water Resources Control Board and the EPA subsequently approved these standards. These standards limit dissolved concentrations of cadmium (0.00022 mg/l), copper (0.0056 mg/l), zinc (0.016 mg/l), and pH (6.5 to 8.3 with a maximum deviation of 0.3units from ambient conditions). The California Fish and Game has identified these levels of metals as protective of all life stages of anadromous salmon and steelhead below Keswick Dam. These recommended levels were adopted by the Regional Board as Basin Plan objectives for the Keswick Dam area and approved by the State Board in August, 1984. EPA approved the objectives under CWA 303 on August 7, 1985. EPA Water Quality Criteria for protection of aquatic life below Keswick Dam are cadmium (0.00055. mg/1), copper (0.0054 mg/1), and zinc (0.047 mg/1).

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Aquatic Life

The runoff of metals bearing acid mine drainage has impacted the fishery resources of the Sacramento River. The major fishery

resources of the Sacramento River below Keswick Dam include migratory populations of salmon and steelhead and resident populations of wild trout. The adult salmon and steelhead migrate from the ocean to the river where they reproduce. The young remain in the river through the juvenile life stage or sometime longer in the case of steelhead. Metal laden discharges from the Spring Creek Basin frequently occur at the time of year that the salmonoid life stage most sensitive to metal toxicity is abundant in the river.

The estimated monetary value of the chinook salmon and steelhead trout runs produced upstream from the Red Bluff Diversion dam is \$33.7 million annually. The economic value of these fishery resources, once restored, is expected to increase to \$72 million annually. The metals from IMM have contributed to fish kills as well as incidents of sublethal toxicity which reduce the overall productivity of the population, including effects such as reduced growth rates, physiological problems, and diminished immune response.

The continuous release of metals from IMM has contributed to a steady decline in the fisheries population in the Sacramento River. California Fish and Game has estimated that the fall run of chinook salmon in the upper Sacramento River has ranged from an estimated high of 400,000 in 1953 to a low of 20,000 with an average decline of 87 percent in the last 20 years. The average run of salmon has declined from from 275,000 to 75,000 salmon. The upper Sacramento River once produced half of the state's chinook salmon.

IMM has been responsible for numerous fish kills in the Sacramento River. There have been thirty nine documented fish kills near Redding since 1940. In February, 1964 an estimated 100,000 fish were killed in a single incident. A fish kill in January-February 1967 killed an estimated 47,100 trout. In 1969, a significant fish kill that destroyed all the salmon fry in the Redding area, occurred when the Spring Creek Debris Dam overflowed. During overflow of the debris dam in January, 1978, there was a documented loss of 37 percent of the salmon fry in the Redding area. In January 1979, a release of contaminated water made necessary by IMMI's violation of its Regional Board order led to another significant fish kill. Most recently, IMMI's violation of another Regional Board order was a contributing factor in yet another fish kill in March, 1989. In addition to these fish kills, an accidental release of IMM sediments impounded behind the Spring Creek Debris Dam occurred in the Fall of 1988, resulting in a plume of heavy metal laden sediments flowing down the Sacramento River, causing the City of Redding to close its municipal water intake wells.

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In Mr. Bontadelli's letter requesting EPA assistance with the impending fish emergency for the winter of 1989-90, he stated that "It is well documented that drainage from Iron Mountain Mine contains concentrations of metals and acid toxic to fish and other aquatic life. Fishery resources vulnerable to destruction include four races of chinook salmon, steelhead, and rainbow trout. The chinook salmon include: the winter-run chinook, which is going to be listed as a State endangered species and a Federal

threatened species; spring-run and late fall-run chinook, which are both at low population levels; and the fall-run chinook, which is the stock that supports California's important sport and commercial salmon fishery. Last year the spawning grounds that were protected from fish kills from Iron Mountain Mine produced over 30 million dollars worth of salmon. Historic fish kills have destroyed fish that are life stages between embryo and adult in as little as a 48-hour exposure period. Fish kills impact the sport and commercial salmon fisheries in future years.

Water Resources

In recent years, recurring drought conditions have underscored the importance of water conservation in California. The continued need to rely upon water from Lake Shasta and Keswick Reservoir to mitigate the impacts of acid mine drainage renders significant quantities of water unavailable for beneficial uses, resulting in a significant adverse impact on the human environment. An estimated 64,000 acre feet were released in March, 1989 to prevent a massive fish kill. During a late winter storm it normally requires a Shasta release 40 to 50 times that of Spring creek to provide non-toxic conditions for salmon.

As water demands continue to grow in the state, it is probable that less dilution water will be made available for IMM wastes.

Public health impacts. Near its source, the acid mine drainage contains sulfuric acid in concentrations that could

cause serious eye injuries and skin irritation through dermal contact. Although the property owner has posted the property to discourage trespassers who might become exposed, the property is located between two heavily used National Forests and direct exposure can not be ruled out as a possibility.

Direct ingestion of contaminated fish from the Sacramento River does not pose a present health threat. However, without remediation, IMM releases will continue to deposit effluent in sportfishing areas and the concentration of cadmium will continue to be elevated above normal levels, resulting in potential bioaccumulation of cadmium in the livers and kidneys of those who ingest contaminated fish from the river.

III. Conclusions of Law

- A. Iron Mountain Mine, Inc., Ted Arman and Stauffer Chemical Co. are "persons" as defined in Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).
- B. The transaction whereby the IMM property was transferred from Stauffer to IMMI is a "contractual relationship" as defined in Section 101(35) of CERCLA, 42 U.S.C.§ 9601(35).
- C. The Iron Mountain Mine is a "facility" as defined in Section 101(9) of CERCLA, 42 U.S.C. § 9601(9). In <u>United States</u>

 v. Iron Mountain Mines and T.W. Arman (E.D.Cal.; August 29, 1988)

 Docket No. 87-1189, p. 3, the court found that the Site is a facility as defined by CERCLA.
- D. Copper, cadmium, zinc and acid mine drainage are "hazardous substances" as defined in Section 101(14) of CERCLA,

E. The release of acid mine drainage, containing cadmium, copper and zinc constitutes a "release" or "threatened release" of hazardous substances into the environment as defined in Section 101(22) of CERCLA, 42 U.S.C. § 9601(22). In <u>United States v. Iron Mountain Mines and T.W. Arman</u> (E.D.Cal.; August 29, 1988) Docket No. 87-1189, p. 3, the court found that EPA's conclusions "that there had been releases of hazardous substances at the Site and that releases would occur in the future...are overwhelmingly supported by the available data."

F. Iron Mountain Mine, Inc., Ted Arman and Stauffer Chemical Co. are liable persons as provided in Section 107(a)(3) of CERCLA, 42 U.S.C. § 9607(a)(3).

IV. <u>Determinations</u>

Based on the Findings of Fact and Conclusions of Law, the Director, Hazardous Waste Management Division, EPA Region 9, has made the following determinations:

- A. The release or threatened release of hazardous substances and pollutants or contaminants from the Iron Mountain Mine may present an imminent and substantial endangerment to the public health, welfare, or the environment.
- B. In order to prevent or mitigate significant risk of harm to the environment, a removal action must be commenced immediately to reduce the acid mine drainage from the facility.

C. The removal measures required by this Order are both necessary and consistent with the National Contingency Plan, 40 Code of Federal Regulations, Part 300.

V. Order

Based upon the Findings of Fact, Conclusions of Law and Determinations, Respondents are hereby Ordered to implement the following measures under the direction of EPA. Respondents IMMI and Ted Arman shall be solely responsible for implementing the tasks required by this section unless and until EPA determines that IMMI and Ted Arman are not complying with any aspect of this Order in a timely fashion. In the event of such an EPA determination, EPA may notify the Respondents of this determination, after which time IMMI, Ted Arman, and Stauffer Chemical Corporation shall implement the activities required by this Order.

All submittals required to be submitted to EPA for review by this Order are subject to review and approval or modification by EPA. EPA may unilaterally modify any submittal or require the Respondents to resubmit any submittal for revisions if EPA determines the submittal is unacceptable. Any revised workplan and/or schedule shall be resubmitted within a time to be designated by EPA. Upon approval by EPA, the submittal shall be a binding portion of this Order.

A. Within seven calendar days of the date of receipt of this Order, Respondents shall notify EPA in writing of their intent to comply with this Order. The notification shall specifically address Respondents' intent to comply with paragraphs B, C,

D, and E of this section.

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B.(1) Within 30 days of the date of this Order, Respondents shall submit for EPA review and approval a workplan and schedule of implementation for the removal of copper, cadmium and zinc from the Richmond Portal acid mine drainage (AMD) outflow and removal of copper from the Lawson Portal and Old Mine/No. 8 out-The workplan shall provide for treatment capacity capable flows. of removing at least 95% of each of the metals copper, cadmium and zinc from a minimum of 60 gallons per minute of the Richmond Portal AMD flow. The workplan shall provide treatment capacity capable of removing 95% of the copper from all Richmond Portal AMD flow in excess of 60 gallons per minute and 95% of the copper from all flows from the Lawson Portal and Old Mine/No. 8. workplan shall provide for the metals removal from the Richmond Portal, Lawson Portal and Old Mine/No. 8 flows during the period from December 1, 1989 through March 31, 1990 inclusive. workplan should take into account previous experience at the site during EPA's treatment of Richmond Portal AMD during December, 1989 to March, 1989. The workplan shall provide some means of disposal for the sludge generated by the treatment process.

In the event Respondent(s) are unable to achieve 95% copper removal from the flows from Old Mine/No. 8, Respondent(s) may request a variance from this requirement. EPA will grant a variance if the documentation submitted with the request demonstrates that the Respondent(s) are achieving the highest possible rate of removal from the Old Mine/No. 8 flows and that removal rate is less than 95%.

If the workplan submitted pursuant to this section will rely on the use of the existing cementation plant(s), flume system and settling basins, the workplan shall (a) demonstrate that each component of the existing system is operable and in good repair or shall provide for the necessary improvements or an entirely new system; (b) provide for an operations and maintenance program that ensures continued system performance; and (c) provide a plan for emergency operations procedures and emergency maintenance procedures to assure maximum removal during emergencies and to minimize system downtime resulting from any necessary maintenance.

The workplan shall provide for a sampling program, with appropriate quality assurance and sampling protocols, to provide data to monitor the effectiveness of the treatment processes.

The workplan shall require the use of appropriate technologies. EPA has identified neutralization with lime, limestone, magnesium oxide or combinations thereof as appropriate technologies for treatment of the Richmond portal effluent to reduce zinc, copper and cadmium. EPA has identified copper cementation as an appropriate technology for treatment of the flows from the Richmond Portal, Lawson Portal, and Old Mine/No.8.

- (2) Immediately upon receipt of EPA's approval of the workplan and schedule, Respondents shall begin implementation of removal of copper, cadmium and zinc from the Richmond Portal AMD outflow and removal of copper from the Lawson Portal and Old Mine/No. 8 outflows in accordance with the approved schedule.
 - C.(1) Within 45 days of the date of this Order, Respondents

for implementation that provides for the removal of copper, cadmium and zinc from the flows currently directed to the Boulder Creek and Slickrock Creek cementation plants. The workplan shall provide for metals removal during the period of implementation of the remedial actions provided for in the ROD, and should be designed to complement those remedial actions. The workplan shall identify applicable or relevant and appropriate requirements ("ARARS") and indicate the manner in which the plan will attain ARARS. If the workplan will not attain compliance with ARARS the workplan shall state which standards will be achieved and shall state which provisions of CERCLA § 121(d)(4)(A-F) are applicable to the response action. The schedule shall provide for the implementation of the workplan as expeditiously as practicable.

shall submit for EPA review and approval a workplan and schedule

The workplan should take into account previous experience and the level of metal removal accomplished at the Site during EPA's treatment of acid mine drainage from the Richmond Portal during December, 1988 to March, 1989 and Respondents' past experience in operating the copper cementation plants.

The workplan should take into account expected variations in acid mine drainage flows and the potential need for additional controls during critical time periods for fishery resource impacts.

The workplan shall provide some means of disposal for the sludge generated by the treatment process.

The workplan shall provide for a sampling program, with appropriate quality assurance and sampling protocols, to provide

data to monitor the effectiveness of the treatment processes.

If the workplan submitted pursuant to this section will rely on the use of the existing cementation plant(s), flume system and settling basins, the workplan shall (a) demonstrate that each component of the existing system is operable and in good repair or shall provide for the necessary improvements or an entirely new system; (b) provide for an operations and maintenance program that ensures continued system performance; and (c) provide a plan for emergency operations procedures and emergency maintenance procedures to assure maximum removal during emergencies and to minimize system downtime resulting from any necessary maintenance.

- (2) Immediately upon receipt of EPA's approval of the workplan and schedule, Respondents shall begin implementation of the workplan for removal of copper, cadmium and zinc from the flows to the cementation plants in accordance with the approved schedule.
- D.(1) Within 45 calendar days of the date of this Order, Respondents shall submit for EPA review and approval a workplan and schedule of implementation to prevent releases of copper, cadmium and zinc from tailings piles, mineral stockpiles and dumps ("tailings") from the IMM property to Boulder Creek and Slickrock Creek. The workplan shall identify ARARs and indicate the manner in which the plan will attain ARARs. If the workplan will not attain compliance with ARARs the workplan shall state which standards will be achieved and shall state which provisions of CERCLA § 121(d)(4)(A-F) are applicable to the response action.

The workplan shall identify all tailings addressed by the plan by nature of the mineral, estimated quantity and location. The workplan shall include a map indicating the location of each tailings pile. The schedule shall provide for the implementation of the workplan as expeditiously as practicable. To the extent practicable, the schedule shall provide for control of the following sources of releases on a priority basis: Sites 14, 15 and 34 (as identified in the RI/FS) and the Boulder Creek Waste Rock Dump (as identified in the Ottwater report, document 54 in the Administrative Record for the October 3, 1986 Record of Decision).

If the workplan relies upon removal of the tailings through sales or otherwise, the workplan shall provide for expeditious removal of all such tailings from the IMM property. A schedule for removal shall be provided and shall identify specific sources of tailings, quantities and the specific time period during which removal of each will occur. The workplan shall provide a time period by which all tailings will be removed from IMM property and shall provide milestones by which regular and continuing compliance can be measured and enforced. The workplan shall identify any necessary technique or control needed to control discharge of contaminants from contaminated soils beneath the removed tailings.

If the workplan does not require removal of such tailings, the workplan shall provide for implementation of controls in an expeditious manner which will control the release of contaminants from the tailings. If a tailings pile is to be controlled in

place, the workplan shall demonstrate that the current location 1 of the tailings is suitable such that physical features such as 2 steep slopes, surface flows, run-off from springs or other land 3 features will not interfere with the effectiveness of the 4 proposed controls and that sufficient controls are available to 5 control the discharge of the contaminants in their current loca-6 7 If a tailings pile is to be relocated and controlled, the workplan shall provide for removal of the tailings from their 8 current location, control of contaminant discharge from remaining 9 soils, placement in an appropriate facility and necessary con-10 trols at the new location. The workplan shall identify the new 11 location and demonstrate its suitability. If tailings may be 12 13 removed from the new location for sales or otherwise, the 14 workplan shall identify all necessary procedures to control con-15 taminant discharge during and after removal. The workplan shall 16 provide for development of an Operations and Maintenance Manual 17 for the containment facility.

(2) Immediately upon receipt of EPA's approval of the workplan and schedule for prevention of releases from tailings, Respondents shall begin implementation of the workplan in accordance with the approved schedule.

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E.(1) Within 45 calendar days of the date of this Order, Respondents shall submit a workplan for EPA review and approval that provides for maintenance of roads and any other means of egress required for EPA or its designee to inspect any portion of the response action or to conduct sampling, or otherwise enforce this order.

(2) Immediately upon receipt of EPA's approval of the workplan, Respondents shall begin implementation of the workplan for maintenance of roads and other means of egress.

VI. Compliance With Other Laws

Respondents shall comply with all federal, state and local laws and regulations in carrying out the terms of this Order. All hazardous substances removed from the facility must be handled in accordance with the Resource Conservation and Recovery Act of 1976, 42 U.S.C. § 6921, et seq., the regulations promulgated under that Act and EPA's Offsite Disposal Policy. Nothing in this Order shall excuse noncompliance by any Respondent with any requirement of any applicable federal, state or local law or regulation.

VII. On-Scene Coordinator/Remedial Project Manager

EPA may appoint an On-Scene Coordinator (OSC) for the Site who will have the authority vested in the On-Scene Coordinator by 40 C.F.R. Part 300, et seq. The Remedial Project Manager for IMM for the purposes of this Order is:

Rick Sugarek
United States Environmental Protection Agency
Region 9
215 Fremont Street
San Francisco, California 94105
(415) 974-9312

San Francisco, California (415) 974-9312

VIII. Submittals

All submittals and notifications to EPA required by this Order or the plans shall be made to:

Director, Hazardous Waste Management Division United States Environmental Protection Agency Region 9 215 Fremont Street

San Francisco, California 94105

Copies of all submittals and notifications shall be sent to the Remedial Project Manager.

All approvals and decisions of EPA made regarding the submittals and modifications shall be communicated to Respondents by the Director, Hazardous Waste Management Division or his designee. No informal advice, guidance, suggestions, or comments by EPA regarding reports, plans, specifications, schedules, or any other matter will relieve Respondents of their obligation to obtain formal approvals as required by this Order.

IX. Access

Respondents shall provide EPA employees and other representatives with complete access to the facility at all times. Nothing in this Order limits any access rights that EPA or other agencies may have pursuant to law.

X. Endangerment During Implementation

The Director, Hazardous Waste Management Division, EPA
Region 9, may determine that acts or circumstances (whether related to or unrelated to this Order) may endanger human health,
welfare or the environment and may order the Respondents to stop

further implementation of this Order until the endangerment is abated.

XI. <u>Indemnification</u>

Respondents shall indemnify and hold harmless the United States Government and its employees and other representatives for any injuries or damages to persons or property resulting from the acts or omissions of Respondents, their employees or other representatives caused by carrying out this Order.

For the purposes of this Order, the United States Government is not a party to any contract with the Respondents.

XII. Noncompliance

- A. A willful violation or failure or refusal to comply with this Order may subject Respondents to a civil penalty of up to \$25,000 per day in which the violation occurs or failure to comply continues, pursuant to the provisions of Section 106(b)(1) of CERCLA, 42 U.S.C. § 9606(b)(1). Failure to comply with this Order without sufficient cause may also subject Respondents to punitive damages of up to three times the total costs incurred by the United States for site response pursuant to Section 107(c)(3) of CERCLA, 42 U.S.C.§ 9607(c)(3).
- B. EPA may take over the removal action at any time if EPA determines that Respondents are not taking appropriate action.

 EPA may order additional actions it deems necessary to protect public health, welfare, or the environment.

XIII. Opportunity to Confer

Respondents may request a conference with the Director, Hazardous Waste Management Division, EPA Region 9, or his staff to

discuss the provisions of this Order. At any conference held pursuant to Respondents request, Respondents may appear in person or by counsel or other representatives for the purpose of presenting any objections, defenses or contentions which Respondents may have regarding this Order. If Respondents desire such a conference, Respondents must make a request orally within three (3) days of receipt of this Order, and confirm the request in writing within seven (7) days of the receipt of this Order.

XIV. Parties Bound

This Order shall apply to and is binding upon the Respondents, their officers, directors, agents, employees, contractors, successors, and assigns.

XV. Notice of Intent to Comply

Upon receipt of this Order, Respondents shall orally inform EPA of their intent to comply with the terms of this Order. The oral notice shall be confirmed within seven (7) days of the receipt of this Order by written notice to the Director. Failure to timely notify EPA of the Respondents' intent to comply will be construed by EPA as a refusal to comply.

XVI. Notice to State

Notice of the issuance of this Order has been given to the State of California. EPA will consult with the California Department of Health Services, as appropriate, to ensure that the plans submitted by Respondents are consistent with State requirements.

XVII. Effective Date

Notwithstanding any conferences requested pursuant to the provisions of this Order, this Order is effective on the date of

1	execution by the Director, Hazardous waste Management Division,		
2	EPA Region 9.		
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4	IT IS SO ORDERED on this 15th day of August , 1989.		
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7	UNITED STATES ENVIRONMENTAL PROTECTION AGENCY		
8			
9	by: havalloder for		
10	Jeff Zelikson		
11	Director, Hazardous Waste Management Division		
12	EPA, Region 9		
13			
14			
15	Contacts:		
16	Rick Sugarek		
17	Remedial Project Manager		
18			
19	Michael B. Hingerty		
20	Assistant Regional Counsel		
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